



Touchstone® WBM650 Wideband Modem User's Guide

Get ready to experience the Internet's express lane! Whether you are checking out streaming media, downloading new software, or checking your email, the Touchstone® WBM650 Wideband Modem brings it all to you faster and more reliably. The high-speed, always-on connection won't keep you waiting.

The Touchstone Wideband Modem provides an Ethernet connection for use with either a single computer or home/office LAN. Installation can be as simple as making three connections and restarting your computer. Your cable company will provide help with any special requirements.

Follow the links below for more information and detailed instructions.

[Safety Requirements](#)

[Getting Started](#)

[Installing and Connecting Your Wideband Modem](#)

[Using the Wideband Modem](#)

[Troubleshooting](#)

[Glossary](#)

Export Regulations

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Safety Requirements

ARRIS complies with the applicable requirements for performance, construction, labeling, and information as outlined below:



CAUTION
Risk of damage

To prevent overheating your Wideband Modem, do not block the ventilation holes on the unit.

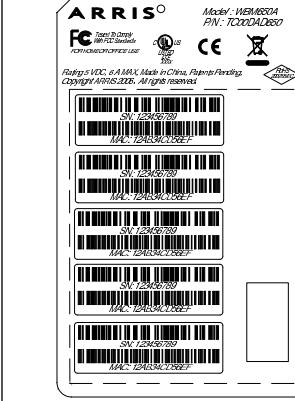
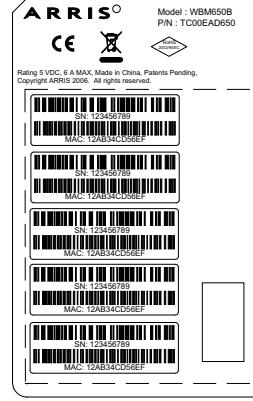
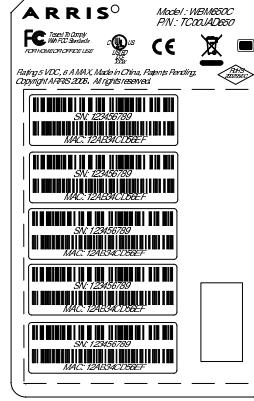
- Equipment should be installed near the power outlet and should be easily accessible.
- The shield of the coaxial cable must be connected to earth (grounded) at the entrance to the building in accordance with applicable national electrical installation codes. In the U.S., this is required by Section 820.93 of the National Electrical Code, ANSI/NFPA 70. In the European Union and in certain other countries, CATV installation equipotential bonding requirements are specified in IEC 60728-11, Cable networks for television signals, sound signals and interactive services — Part 11: Safety. This equipment is intended to be installed in accordance with the requirements of IEC 60728-11 for safe operation.
If the equipment is to be installed in an area serviced by an IT power line network, as is found in many areas of Norway, special attention should be given that the installation is in accordance with IEC 60728-11, in particular Annex B and Figure B.4.
- Install the Wideband Modem in accordance with article 820 of the NEC and section 54 of the CEC.
- Do not use the Wideband Modem near water (i.e. wet basement, bathtub, sink or near a swimming pool, etc.). Avoid pouring or spilling liquids on the Wideband Modem.
- Avoid using and/or connecting the Wideband Modem during an electrical storm.
- Do not locate the Wideband Modem near a heat source (i.e. heat registers, space heaters, fireplaces, etc.).
- Use only AC adapter and power cord included with the Wideband Modem.



- Install the Wideband Modem near an easily accessible AC socket-outlet.
- Clean the Wideband Modem only with a dry cloth.

Markings, Symbols, and Labels

Regulatory Symbols

DOCSIS® Modems	Euro-DOCSIS® Modems	Japan DOCSIS Modems
		

Functional Indicators

Symbol	Definition
⚠	Instructions: The exclamation point within a triangle alerts you to the presence of important operating and maintenance instructions.
~	Alternating Current: A terminal to which or from which an alternating (sine wave) current or voltage may be applied or supplied.
—	Direct Current: A terminal to which or from which a direct current or voltage may be applied or supplied.

Radio Frequency Emissions and Immunity

United States Compliance

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Product Safety

UL listed per UL60950.

European Compliance



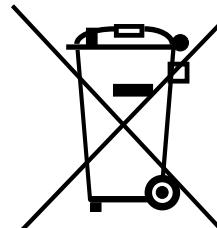
This product complies with the provisions of the Electromagnetic Compatibility (EMC) Directive (89/336/EEC), the Amending Directive (92/31/EEC), the Low Voltage Directive (73/23/EEC), and the CE Marking Directive (93/68/EEC). As such, this product bears the CE marking in accordance with the above applicable Directive(s).

A copy of the Declaration of Conformity may be obtained from: ARRIS International, Inc., 3871 Lakefield Drive, Suite 300, Suwanee, GA 30024.

As indicated by the symbol below, disposal of this product or battery is governed by Directive 2002/96/EC of the European Parliament and of the Council on waste electrical and electronic equipment (WEEE). WEEE could potentially prove harmful



to the environment; as such, upon disposal of the product the Directive requires that this product must not be disposed as unsorted municipal waste, but rather collected separately and disposed of in accordance with local WEEE ordinances.



This product complies with directive 2002/95/EC of the European Parliament and of the Council of 27 January 2003 on the restriction of the use of certain hazardous substances (RoHS) in electrical and electronic equipment.



Japanese Compliance

VCCI

This equipment complies with the Class B category for information technology equipment based on the rules of Voluntary Control Council for Interference by Information Technology Equipment. When used in a residential area, radio interference may be caused. In this case, the user may be required to take appropriate corrective actions.

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に基づくクラス A 情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。



PSE

This equipment has been tested to comply with the DENAN standards. DENAN standards are IEC Standards with Japanese national differences and Electromagnetic Interference. Testing to these standards comprise the CB report/Declaration of Conformity that is on file with the manufacturer's representative.

Korean Compliance

Class B Device. This device is registered for EMC requirements for residential use. This device can be used not only in residential areas but in all other areas.



1. 기기의 명칭(모델명) :
2. 인증번호 :
3. 인증받은자의 상호 :
4. 제조년월 :
5. 제조자/제조국가 :



Getting Started

About Your New Wideband Modem

The Touchstone WBM650 Wideband Modem has the following features:

- Speed: much faster than dialup or ISDN service, over four times faster than standard cable modems
- Compatibility: supports tiered data services (if offered by your cable company)

What's in the Box?

Make sure you have the following items before proceeding. Call your cable company for assistance if anything is missing.

- Wideband Modem
- AC Adapter
- Quick Installation Guide
- End User's License Agreement
- Ethernet Cable
- CD-ROM

What's on the CD?

The CD provides the following items:

- User's Guide
- Adobe Acrobat Reader
- ARRIS Contact Information
- End User License Agreement



Items You Need

If you are installing the Wideband Modem yourself, make sure you have the following items on hand before continuing:



Coax Cable

- **Wideband Modem package:** see [What's in the Box?](#) for a list of items in the package.
- **Coaxial cable (coax):** as shown in the picture to the left, this is a thin cable with a connector on each end. It is the same kind of wire used to connect your television for cable TV. You can buy coax from any electronics retailer and many discount stores; make sure it has connectors on both ends. (There are two types of connectors, slip-on and screw-on; the screw-on connectors are best for use with your Wideband Modem.) The coax should be long enough to reach from your Wideband Modem to the nearest cable outlet.
- **Splitter (optional):** provides an extra cable connection by splitting a single outlet into two. You may need a splitter if you have a TV already connected to the cable outlet that you want to use. You can buy a splitter from any electronics retailer and most discount stores; you may also need a short piece of coaxial cable (with connectors); use it to connect the splitter to the cable outlet and then connect the Wideband Modem and TV to the splitter.

Note: A splitter effectively cuts the signal in half and sends each half to its two outputs. Using several splitters in a line may slow down or stop Internet communications, or cause snowy TV pictures.

- **Information packet:** your cable company should furnish you with a packet containing information about your service and how to set it up. Read this information carefully and contact your cable company if you have any questions.



System Requirements

The Touchstone Wideband Modem operates with most computers. The following describes requirements for each operating system; see the documentation for your system for details on enabling and configuring networking.

To use the Wideband Modem, you need DOCSIS high-speed Internet service from your cable company.

Windows

Windows 95, Windows 98, Windows 98 SE (Second Edition), Windows ME, Windows 2000, or Windows XP

MacOS

System 7.5 to MacOS 9.2 (Open Transport recommended) or MacOS X

Linux/other Unix

Hardware drivers, TCP/IP, and DHCP must be enabled in the kernel



About Ethernet

Ethernet is a standard method of connecting two or more computers into a Local Area Network (LAN).

Note: To connect two or more computers to the Ethernet port, you need a hub or broadband router (available at computer retailers).

The Wideband Modem package comes with a 6-foot (1.9m) straight-through Ethernet cable (the connectors look like wide telephone connectors); you can purchase other cables if necessary at a computer retailer. If you are connecting the Wideband Modem directly to a PC, or to an Ethernet hub or broadband router with a cross-over switch, and activate the cross-over switch, ask for Category 5E (CAT5E) straight-through cable. If you are connecting the Wideband Modem to an Ethernet hub or broadband router without a crossover switch, ask for a Category 5E cross-over cable.

For more information about connecting two or more computers, contact your cable service provider.



Ethernet Cable

What About Security?

Having a high-speed, always-on connection to the Internet requires a certain amount of responsibility to other Internet users—including the need to maintain a reasonably secure system. While no system is 100% secure, you can use the following tips to enhance your system's security:

- Keep your operating system updated with the latest security patches. Run the system update utility at least weekly.
- Keep your email program updated with the latest security patches. In addition, avoid opening email containing attachments, or opening files sent through chat rooms, whenever possible.
- Install a virus checker and keep it updated.
- Avoid providing web or file-sharing services over your Wideband Modem. Besides certain vulnerability problems, most cable companies prohibit running servers on consumer-level accounts and may suspend your account for violating your terms of service.
- Use the cable company's mail servers for sending email.
- Avoid using [proxy](#) software unless you are certain that it is not open for abuse by other Internet users (some are shipped open by default). Criminals can take advantage of open proxies to hide their identity when breaking into other computers or sending spam. If you have an open proxy, your cable company may suspend your account to protect the rest of the network.
- If you connect your Wideband Modem to a wireless LAN, make sure you enable security and encryption on the wireless hub (for the same reason that you should run only secured proxies). Consult the documentation and technical support of the wireless equipment provider for help.



Installing and Connecting Your Wideband Modem

Before you start, make sure that:

- You have contacted your cable company and verified that they provide data service using ARRIS FlexPath™ technology.
- You have all the [Items You Need](#).
- Cable and power outlets are available near the PC. If a cable outlet is not conveniently located, your cable company can install a new one.

Getting Service

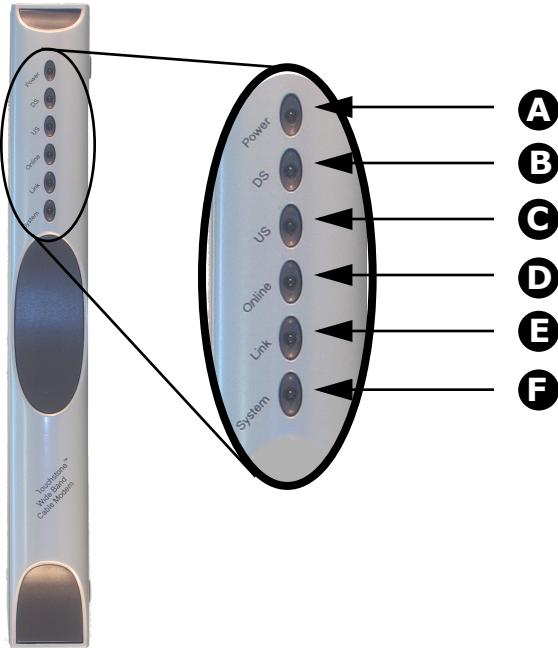
Before trying to use your new Wideband Modem, contact your local cable company to establish an Internet account. When you call, have the following information ready:

- the Wideband Modem serial numbers and MAC addresses (printed on a sticker on the bottom of the Wideband Modem)
- Note:** The Wideband Modem has four separate serial numbers and MAC addresses.
- the model number of the Wideband Modem

Save this information for future use. In addition, you should ask your cable company the following questions:

- Do you have any special system requirements or files that I need to download after I am connected?
- When can I start using my Wideband Modem?
- Do I need a user ID or password to access the Internet or my e-mail?

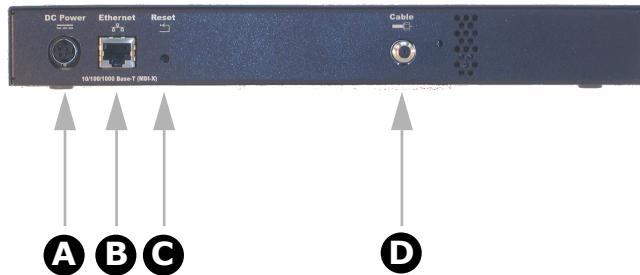


Wideband Modem Front Panel**Front Panel**

The front of the Wideband Modem has the following indicators and controls:

- A Power:** blinks when the Wideband Modem is setting up; on steadily when ready for use.
- B DS:** blinks when connecting to the cable system; on steadily otherwise.
- C US:** blinks when sending data on the cable system; on steadily otherwise.
- D Online:** blinks when the Wideband Modem is registering with the network; on steadily when connected to the Internet; off when disconnected from the Internet.
- E Link:** flickers when sending or receiving data to the PC over the Ethernet connection; on steadily otherwise.
- F System:** on when the Wideband Modem can bridge data between the network and the attached CPE; off when the Wideband Modem is not ready to bridge data; blinks when the Wideband Modem cannot bridge data due to a system error.

Wideband Modem Rear Panel



Rear Panel

The rear of the Wideband Modem has the following connectors and controls:

- A Power: plug the AC adapter in here.
- B **Ethernet connector**: a 10/100/1000 Base-T interface for connecting the Wideband Modem to a PC or home network LAN. The Ethernet connector is compatible with 1000 Mbps (Gigabit), 100 Mbps (Fast), and 10 Mbps attached CPE devices. Recommended connections are 100 Base-T or 1000 Base-T to achieve best performance.
Note: To avoid reduced data throughput performance, do not connect the Wideband Modem to a 10 Mbps device. Certain routers or wireless devices may also reduce performance.
- C **Reset** button: resets the Wideband Modem as if you disconnected power. Use a pointed non-metallic object to press this button.
- D Cable: plug the coax cable in here.

Mounting the Wideband Modem

You can either mount the Wideband Modem on a wall or place it on a desktop. For wall-mount applications, you can mount the Wideband Modem with the indicators facing upward (vertical) or to the side (horizontal).

Tools and Materials

For wall-mounted installations, make sure you have the following tools and materials before proceeding:

- screwdriver (flat-blade or Phillips, depending on what kind of screws you use)
- wall-mount template (included with the Wideband Modem Quick Installation Guide)
- transparent tape (for temporarily securing the mounting template to the wall)
- for mounting on plywood or studs: two #6 (or #8) x 38.1 mm (1.5 inches) self tapping screws; the head diameter should be approximately 6 mm (0.25 inches)
- for mounting on drywall: two 1.5 inch (35mm or 40mm) anchor bolts

Location

Always position the Wideband Modem:

- within 1.3 m (4 feet) of an AC outlet. The power cord must reach the outlet without stretching and without adding extension cords.
- near a cable outlet (to avoid long cable runs).

Note: When mounting the Wideband Modem on drywall, try to position the Wideband Modem so at least one of the screws are fastened to a stud. This may prevent the Wideband Modem from pulling out of the wall in the future.

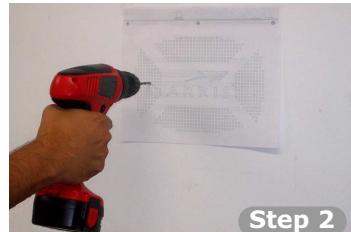
To prevent overheating your Wideband Modem, do not block the ventilation holes on the sides of the unit.



Instructions



Step 1



Step 2



Step 3



Step 4

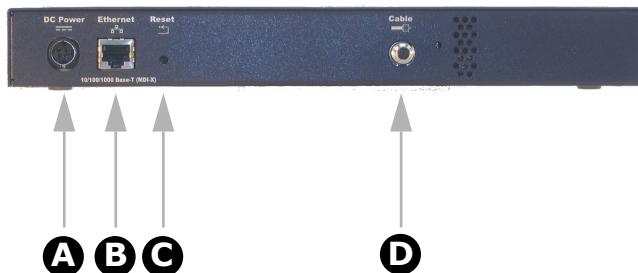
Wall-mounting instructions

- 1 Position the mounting template on the surface where you intend to mount the Wideband Modem and secure in place with transparent tape.
- 2 Drill holes through the template in the specified locations for the mounting screws. After drilling holes, remove the template from the surface.
- 3 Drive both of the screws (or anchor bolts) into the wall. Leave a gap of about 6 mm (0.250 inches) between the screw head and the wall.
- 4 Orient the Wideband Modem with the indicator lights facing up. Slip both mounting slots (in the back of the Wideband Modem) over the screws, then slide the case down until the narrow end of the keyhole slot contacts the screw shaft.
- 5 Proceed to [Connecting the Wideband Modem](#).

Desktop mounting instructions

- 1 Position the Wideband Modem so that:
 - air flows freely around it
 - the back faces the nearest wall
 - it will not fall to the floor if bumped or moved
- 2 Proceed to [Connecting the Wideband Modem](#).



Rear Panel

- A** Power
- B** Ethernet
- C** **Reset** button
- D** Cable

Connecting the Wideband Modem

- 1** Connect one end of the coaxial cable to the cable outlet or splitter, and the other end to the Wideband Modem's Cable connector. Tighten the connections by hand.

Note: Improperly tightened coaxial cable connectors can cause data errors, making your connection slower.

- 2** Insert the plug from the AC adapter into the Power connector on the Wideband Modem.
- 3** Insert the power cord into a convenient AC outlet.

The Power light on the front of the Wideband Modem should light up, then start flashing. See [Troubleshooting](#) if the Power light does not turn on.

- 4** Connect one end of the Ethernet cable to the port on the back of the Wideband Modem labeled "Ethernet," and the other end to the Ethernet port on a computer, hub, or broadband router. Recommended connections are 100 Base-T or 1000 Base-T to achieve best performance.

Note: If you are connecting to a computer, use the Ethernet cable included in the Wideband Modem package unless it is too short. Longer Ethernet cables are available from any computer retailer. To avoid reduced data throughput performance, do not connect the Wideband Modem to a 10 Mbps device.



Using the Wideband Modem

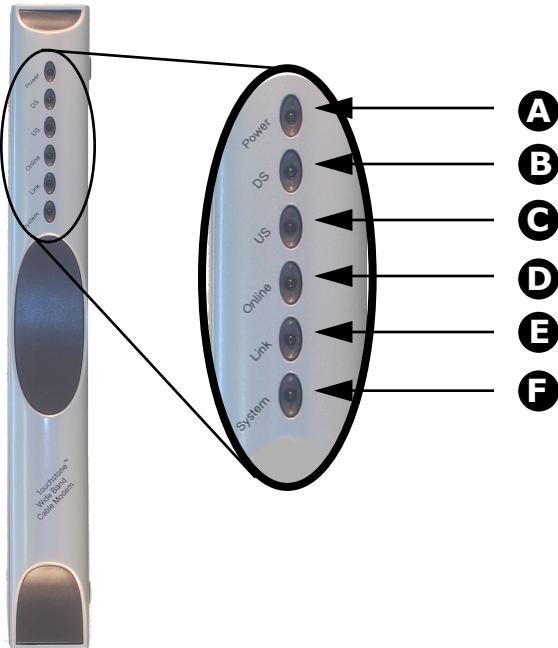
This chapter describes the controls and features available on the Touchstone Wideband Modem, and covers basic troubleshooting procedures.

- [Setting up Your Computer to Use the Wideband Modem](#)
- [Indicator Lights](#)
- [Using the Reset Button](#)

Setting up Your Computer to Use the Wideband Modem

Follow the instructions in the information packet supplied by your cable company. Contact your cable company if you need help setting up your computer.



Wideband Modem Front Panel**Indicator Lights**

The Touchstone™ Wideband Modem has six lights to assist in troubleshooting.

Patterns: Normal Operation

The following table shows indicator light patterns during normal operation. An **x** indicates that the particular light is not important for determining the state.

Name						Description
(A) Power	(B) DS	(C) US	(D) Online	(E) Link	(F) System	
Off	Off	Off	Off	Off	Off	No power to Wideband Modem
On	On	On	On	Off	x	No data to/from the cable interface
On	On	On	On	Blink	On	Data activity on the cable interface
On	On	On	On	Off	On	Ethernet link disconnected (i.e. equipment is disconnected or powered off)
On	On	On	On	Blink	On	Ethernet data activity with connected equipment
On	x	x	x	x	Off	The Wideband Modem is not ready to bridge data between the Ethernet and cable system
On	x	x	x	x	Blink	The Wideband Modem cannot bridge data between the Ethernet and cable system due to a system error



LED Indicators: Startup Sequence

The following table shows the Wideband Modem light patterns during each phase of the startup sequence. An **x** indicates that the light is not important for determining the state.

Name						Description
Power	DS	US	Online	Link	System	
Off	Off	Off	Off	Off	Off	No power to Wideband Modem
On	Off	Off	Off	Off	Blink	Power-on Self Test
Blink	Off	Off	Off	Off	Blink	Self Test failed
On	Blink	x	x	x	Blink	Scanning for downstream RF carrier
On	x	Blink	x	x	Blink	Initial ranging in progress
On	On	On	x	x	Blink	Obtaining data IP address (DHCP)
On	On	On	Blink	x	Blink	Downloading data configuration (TFTP)
On	On	On	On	x	On	Data registration complete





Using the Reset Button

Use the **Reset** button, on the back of the Wideband Modem, to reset the modem as if you disconnected power. You may need to reset the Wideband Modem if you are having problems connecting to the Internet.

Use a pointed non-metallic object to press this button. The photo to the left shows the location of the **Reset** button.

The **Reset** button is recessed to prevent accidental resets.

Troubleshooting

Problems and Solutions

The Wideband Modem is plugged in, but the Power light is off.

Check all power connections. Is the AC adapter plugged in firmly at both ends?

If you plugged the AC adapter into a power strip, make sure the strip is switched on.

Avoid using an outlet controlled by a wall switch, if possible.

Finally, check the fuse or circuit breaker panel.

I'm not getting on the Internet.

It may take up to 30 minutes to establish a connection the first time you power up your Wideband Modem, especially when a lot of people are online. Always leave your Wideband Modem plugged in and connected; use the **Standby** button to disconnect your PC from the Internet.

Check the front panel lights:

- The **Power** and **Online** lights should be on.
- The **Link** light should be either on or blinking.
- The **DS** and **US** lights should be on.
- The **System** light should be on.
- If the **Power** light blinks for more than 30 minutes, call your cable company for assistance.

Check your cable connections. Connectors should be finger-tight. The [coax cable](#) should not be pinched, kinked, or bent sharply—any of these can cause a break or short in the cable (you may have to replace the cable). If you have one or more splitters between the Wideband Modem and CATV outlet, remove the splitters and connect the Wideband Modem directly to the outlet.

Proceed to the next page if necessary.



I'm not getting on the Internet.

If you are using a hub, is the hub turned on? If you have connected the PC or Wideband Modem to the crossover port on a hub, toggle the crossover switch.

Are you using the right type of [Ethernet cable](#)? (Straight cable for direct connection to a PC, cross-over cable for connection to a hub.)

Press the **Reset** button on the back of the Wideband Modem.

I can get on the Internet, but everything is slow.

If the Web site you are visiting is very popular, that site may be having trouble servicing all the requests. If other sites download quickly, wait for a few minutes and try again. Usage during peak hours may also affect the connection speed.

If your Wideband Modem is connected to a LAN (Local Area Network), either directly or through a firewall, other communications on the LAN may slow down your connection. Some broadband routers or wireless hubs may not support the high speeds possible with the Wideband Modem. Connecting the Wideband Modem to 10Base-T devices may limit connection speeds as well.



Glossary

The following is a list of common cable and networking terms.

Terms and Abbreviations

Category 5 (Cat5E)

A high-quality type of cable, used for Fast Ethernet (100BaseT) or Gigabit Ethernet (1000BaseT) connections. When purchasing Ethernet cables, always look for Category 5E cable.

Coaxial cable (coax)

A thin wire, used to connect your television and Wideband Modem to the cable TV system. You can buy coax from any electronics retailer and many discount stores.

Cross-over

An Ethernet cable used to connect two hubs (or a hub and the Wideband Modem) together. Also, some Ethernet hubs may have built-in cross-over on one or more ports (which eliminates the need for a cross-over cable).

DHCP

Dynamic Host Configuration Protocol. An IP protocol used to provide an IP address and location of services (such as DNS and TFTP) needed by a device connecting to the network. DHCP allows the cable company to configure your computer's networking software for you.

DNS

Domain Name Service (Server). An IP service that associates a domain name (such as www.example.com) with an IP address.

Downstream

In an HFC network, the direction from the head-end to the subscriber. Some older cable documentation may refer to this as the forward path.



DOCSIS

Data Over Cable System Interface Specification. The interoperability standards used for data communications equipment on an HFC network.

Ethernet

A standard method of connecting two or more computers into a Local Area Network (LAN).

Euro-DOCSIS

The European version of DOCSIS.

Event

An informational message used for monitoring network status.

F-connector

The type of connector used on coaxial cable. There are two common types of F-connector, slip-on and screw-on. Use coax with screw-on connectors for connecting your Wideband Modem.

Gateway

The device, usually a router, that connects devices on a given IP subnet to other IP subnets.

Headend

The “central office” in an HFC network. The headend houses both video and data equipment. In larger cable networks, a “master” headend often feeds several “remote” headends to provide distributed services.

HTTP

HyperText Transfer Protocol.

Hub

A box with several Ethernet connectors. Ethernet hubs provide a common point of contact for all connected devices.

IP address

A number assigned to your computer by your cable company, used to identify your computer to other systems on the Internet.



ISDN

Integrated Services Digital Network. A digital telephony standard that provides communication speeds about twice as fast as standard dialup.

LAN

Local Area Network. A network that allows computers in a single location (such as a building) to communicate with one another.

MAC address

A number that uniquely identifies any device connected to a network. Your cable company uses your Wideband Modem's MAC address to authorize access to the Internet. The MAC address is printed on a label on the bottom of your Wideband Modem.

Protocol

A set of rules and formats that determines the communication behavior of network entities at a given layer.

Proxy

A device or program that stands in between a server (for example, a web site) and a client (your browser), providing a way to relieve some of the burden from the server. For example, your cable company may have a web proxy that keeps copies of popular web pages; the proxy can send you those pages instead of fetching them directly from the web site, resulting in faster page loading and less network congestion.

RF

Abbreviation for Radio Frequency. Some literature refers to coax as "RF cable" and the connectors as "RF connectors."

RJ-11

A standard 4-pin modular connector, commonly used in North America for connecting telephones.

RJ-45

A standard 6-pin modular connector, commonly used on Ethernet cable. An RJ-45 connector looks like a wide RJ-11 (telephone) connector.



RoHS

Restriction of Hazardous Substances. Refers to items governed by Directive 2002/95/EC of the European Parliament.

Splitter

A small box with three cable connectors: one input and two outputs. You may need a splitter if you have a TV already connected to the cable outlet that you want to use for your Wideband Modem. You can buy a splitter from any electronics retailer and most discount stores.

Switched outlet

A power outlet that may be turned on and off using a wall switch. Usually intended for lamps. Avoid plugging your computer or Wideband Modem into a switched outlet to avoid disruptions.

TCP/IP

Transmission Control Protocol/Internet Protocol. The protocols used to facilitate communications across one or more connected networks.

Upstream

The path from a subscriber device to the headend. Some older cable documentation may refer to this as the return path or reverse path.

WEEE

Waste Electrical and Electronic Equipment. Refers to items governed by Directive 2002/96/EC of the European Parliament and of the WEEE Council.





Touchstone®
WBM650 Wideband Modem User's
Guide

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